

**REMARKS**

Claims 1-50 are all the claims pending in the application. Claims 1 and 12 have been amended. Claim 11 has been canceled. The subject matter of canceled Claim 11 has been incorporated into Claim 1. Claim 12 has been amended to be in independent form and to amend the recited material making the diffusion barrier structure.

The abstract of the disclosure has been amended to remove legal phrases.

The title has been amended. Support for the amendment can be found in the specification, such as in Figure 2.

Therefore, no new matter has been added.

**I. Election/Restriction**

Claims 2-4, 6-7, 9-10, 13, and 15-50 have been withdrawn from consideration.

Applicants respectfully request consideration of Claims 2 to 4 and 6 to 13.

The response to restriction and election of species requirement dated January 27, 2006 elected Group II, Claims 1-45 and Species 2 (fig. 2). The response incorrectly submitted that only Claims 8, 11, 14, and 15 read on the elected species. This was an inadvertent error. In fact, Claim 1-14 read on the elected species. The undersigned apologizes for this error in the response dated January 27, 2006.

As such, Applicants respectfully request consideration of Claims 2 to 4 and 6 to 13.

**II. Specification**

The abstract of the disclosure has been objected to allegedly because of the presence of the legal phraseology “said.” The abstract of the disclosure has been amended. The abstract no longer describes the phrase “said.” Reconsideration and withdrawal are respectfully requested.

At page 3 of the Office Action, the Examiner has required a new title that allegedly is “more clearly indicative of the invention to which the claims are directed by making reference to the diffusion barrier structure between the MR element and the conductor.” The title has been amended. The title contains a reference to a diffusion barrier, conductor, and magnetoresistance element.

**III. Claim Rejection - 35 U.S.C. § 112**

Claim 14 has been rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite.

The Examiner asserts that the phrase “said oxide layer” is indefinite.

Claim 14 has been amended to clarify that the diffusion barrier structure is an oxide layer. As a result, Claim 14 is not indefinite.

**IV. Claim Rejection - 35 U.S.C. § 102**

Claims 1, 5, 8, 11, 12, and 14 have been rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,544,801 to Slaughter *et al.* (“Slaughter ‘801”).

Applicants respectfully traverse this rejection.

Claim 1 presently recites that the diffusion barrier structure is made of oxynitride of element having free energies of oxide and nitride formations less than those of elements included in layers connected on top and bottom surfaces of said diffusion barrier structure.

In contrast, Slaughter '801 discloses that the MTJ cell thereof has a diffusion barrier layer 67 between magnetic layer 66 and top electrode 68. *See*, col. 5, lines 51-55. Slaughter fails to explicitly disclose that the diffusion barrier 67 has free energies of oxide and nitride formations less than those of elements included in magnetic layer 66 and top electrode 68.

Applicants respectfully submit that Slaughter '801 also fails to inherently describe that the diffusion barrier 67 has free energies of oxide and nitride formations less than those of elements included in magnetic layer 66 and top electrode 68. Slaughter '801 fails to disclose the composition of the top electrode 68. As such, Slaughter '801 fails to provide that the top electrode would necessarily provide for a diffusion barrier 67 that has free energies of oxide and nitride formations less than those of elements included in magnetic layer 66 and top electrode 68. *See*, MPEP § 2112 (IV) (2005).

Further, a top electrode (or cap layer), such as the top electrode 68 disclosed in Slaughter '801, commonly is tantalum or aluminum. A tantalum or aluminum top electrode in the MTJ cell disclosed in Slaughter '801 would fail to provide for a diffusion barrier 67 that has free energies of oxide and nitride formations less than those of elements included in magnetic layer 66 and top electrode 68. As such, Slaughter '801 fails to explicitly and inherently describe a diffusion barrier structure made of oxynitride of element having free energies of oxide and

nitride formations less than those of elements included in layers connected on top and bottom surfaces of said diffusion barrier structure.

Further, Claim 12 recites that the diffusion barrier structure is made of material selected from the group consisting of MgO<sub>x</sub>, SiO<sub>x</sub>, TiO<sub>x</sub>, CaO<sub>x</sub>, LiO<sub>x</sub>, HfO<sub>x</sub>, SiN, SiNO, TiN, TiNO, BN, HfNO, and ZrN.

In contrast, Slaughter '801 discloses that diffusion barrier layer 67 can be formed of AlO<sub>x</sub> or TaN<sub>x</sub>. *See*, col. 5, lines 55-57. However, AlO<sub>x</sub> and TaN<sub>x</sub> are different from MgO<sub>x</sub>, SiO<sub>x</sub>, TiO<sub>x</sub>, CaO<sub>x</sub>, LiO<sub>x</sub>, HfO<sub>x</sub>, SiN, SiNO, TiN, TiNO, BN, HfNO, and ZrN. In this regard, Slaughter '801 fails to describe or suggest the magnetoresistance device recited in Claim 12.

Additionally Claims 2-10 and 13-14 depend from Claim 1 or 12. Therefore, Claims 2-10 and 13-14 are novel for at least the same reasons as Claim 1 or 12.

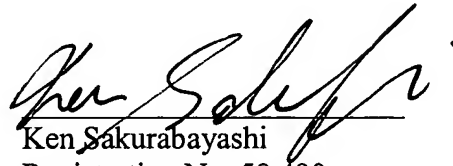
In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111  
Appln. No.: 10/697,124

Docket No: Q78162

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

  
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